Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

　　　　1.　　　(Canceled)

　　　　2.　　　(Currently Amended) ~~The method of claim 1 further comprising:~~ A method for combining lookup tables (LUTs) in a design for a programmable integrated circuit, the method comprising:

　　　　　　　selecting first and second LUTs from the design;

　　　　　　　determining whether both of the LUTs implement a same function;

　　　　　　　if the first and the second LUTs implement the same function, combining masks of the LUTs into a shared LUT mask in the design;

　　　　　　　before determining whether the LUTs implement the same function, identifying common input signals between the first and the second LUTs; and

　　　　　　　~~rearranging~~ arranging an order of input signals of one of the LUTs so that each of the common input signals is applied to a corresponding input terminal in both of the LUTs to provide a first ~~rearranged~~ arranged order of the input signals,

　　　　　　　wherein the method determines whether the LUTs implement the same function based on the first ~~rearranged~~ arranged order of the input signals.

　　　　3.　　　(Currently Amended) The method of claim 2 further comprising:

　　　　　　　if the LUTs do not implement the same function based on the first arranged order, rearranging an order of at least two uncommon input signals of one of the LUTs with respect to input terminals of that LUT to provide a second rearranged order; and

　　　　　　　determining if both LUTs implement the same function based on the second rearranged order of the input signals.

4.   (Canceled)

5.   (Currently Amended) ~~The method of claim 4 further comprising:~~ A method for combining lookup tables (LUTs) in a design for a programmable integrated circuit, the method comprising:

selecting first and second LUTs from the design;

determining whether both of the LUTs implement a same function;

if the first and the second LUTs implement the same function, combining masks of the LUTs into a shared LUT mask in the design;

if the LUTs do not implement the same function, rearranging an order of at least two input signals of the first LUT with respect to input terminals of the first LUT to provide a first rearranged order;

determining if both LUTs implement the same function based on the first rearranged order of the first LUT input signals;

if the LUTs implement the same function with the first rearranged order, combining the masks of the LUTs into a shared LUT mask in the design; and

if the LUTs do not implement the same function with the first rearranged order, rearranging the order of at least two input signals of the first LUT with respect to the input terminals of the first LUT to provide a second rearranged order.

6.   (Original)   The method of claim 5 further comprising:

determining if both LUTs implement the same function based on the second rearranged order of the first LUT input signals;

if the LUTs implement the same function with the second rearranged order, combining masks of the LUTs into a shared LUT mask in the design; and

if the LUTs do not implement the same function with the second rearranged order, rearranging the order of at least two input signals of the first LUT with respect to the input terminals of the first LUT to provide a third rearranged order.

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7.   (Currently Amended) The method of claim ~~1~~2 further comprising:

before determining whether the LUTs implement the same function, determining if the LUTs have at least N common input signals; and

if the LUTs do not have at least N common input signals, preventing the masks of the LUTs from being combined.

8.   (Original)   The method of claim 7 further comprising:

before determining if the LUTs implement the same function, determining if the LUTs have more than M unique input signals; and

if the LUTs have more than M unique input signals, preventing the masks of the LUTs from being combined.

9.   (Currently Amended) The method of claim ~~1~~2 wherein determining if the LUTs both perform the same function further comprises:

determining if an output value of the first LUT equals an output value of the second LUT for each possible input value that is applied to the input terminals of both of the LUTs.

10.   (Currently Amended) The method of claim ~~1~~2 further comprising:

selecting third and fourth LUTs from the design;

determining if both of the third and the fourth LUTs implement a same function;

if the third and the fourth LUTs implement the same function, combining masks of the third and the fourth LUTs into a shared mask in the design.

11.   (Original)   The method of claim 10 further comprising:

if the third and the fourth LUTs do not implement the same function, rearranging an order of at least two input signals of the third LUT with respect to input terminals of the third LUT to provide a first rearranged order; and

determining if both the third and the fourth LUTs implement the same function based on the first rearranged order of the third LUT input signals.

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12. (Currently Amended) The method of claim ~~12~~ further comprising:

breaking apart the mask of the LUTs if the mask lies in a critical path in the design and placing the first and the second LUTs into different logic elements within the design.

13. (Currently Amended) The method of claim ~~12~~ further comprising:

after determining whether both of the LUTs implement the same function, determining if LUTs have at least N common input signals; and

determining whether the LUTs have no more than M unique input signals, wherein the LUT masks are combined into the shared LUT mask only if the LUTs have at least N common input signals and no more than M unique input signals.

14. (Canceled)

15. (Currently Amended) The computer program product of claim ~~14~~20 wherein the program code further includes:

code for determining if the first and the second LUTs have at least N common input signals, before determining whether the first and the second LUTs implement the identical function; and

code for ordering input signals of at least one of the LUTs so that each of the common input signals is applied to a corresponding LUT input terminal in the same order to provide a first rearranged order of the input signals, if the LUTs have at least N common input signals,

wherein the code for comparing the output values of the LUTs determines whether the LUTs implement the identical function based on the first rearranged order of the input signals.

16. (Previously Presented) The computer program product of claim 15 wherein the program code further includes:

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code for rearranging an order of at least two uncommon input signals with respect to input terminals of one the LUTs to provide a second rearranged order, if the LUTs do not implement the same function; and

code for comparing output values of the LUTs to determine if the LUTs generate the identical function based on the second rearranged order of the input signals.

17.   (Currently Amended) The computer program product of claim ~~14~~20 wherein the program code further includes:

code for rearranging ~~an~~ a first order of input signals of one of the LUTs with respect to input terminals of that LUT to provide a first rearranged order of the input signals, if the LUTs do not generate the identical function based on the first order; and

code for determining if the LUTs implement the identical function based on the first rearranged order of the input signals.

18.   (Previously Presented)   The computer program product of claim 17 wherein the program code further includes:

code for combining the masks of the LUTs in the design if the LUTs implement the identical function with the first rearranged order; and

code for rearranging the order of the input signals of one of the LUTs with respect to the input terminals of that LUT to provide a second rearranged order of the input signals, if the LUTs do not implement the identical function with the first rearranged order.

19.   (Previously Presented)   The computer program product of claim 18 wherein the program code further includes:

code for combining the masks of the LUTs in the design if the LUTs implement the identical function with the second rearranged order; and

code for rearranging the order of the input signals of one of the LUTs with respect to the input terminals of that LUT to provide a third rearranged order, if the LUTs do not implement the identical function with the second rearranged order.

20. (Currently Amended) ~~The computer program product of claim 14 wherein the program code further includes:~~ A computer program product comprising a computer readable medium encoded with program code for controlling operation of a computer system to combine lookup tables (LUTs) in a design for a programmable integrated circuit, the program code including:

code for selecting first and second LUTs in the design;

code for comparing output values of the LUTs to determine if the LUTs generate an identical function;

code for combining masks of the LUTs in the design if the LUTs generate the identical function;

code for determining if the LUTs have at least N common input signals; and

code for determining if the LUTs have no more than M unique input signals,

wherein implementation of the code for comparing the output values of the first and second LUTs is prevented if the first and second LUTs have less than N common input signals or more than M unique input signals.

21. (Currently Amended) The computer program product of claim ~~14~~20 wherein the program code further includes:

code for breaking apart the mask of the LUTs if the mask lies in a critical path in the design and placing the first and second LUTs into different logic elements within the design.

22. (Currently Amended) The computer program product of claim 18 wherein the program code further includes:

code for determining if the LUTs have at least N common input signals, after the output values of the LUTs have been compared;

code for determining if the LUTs have no more than M unique input signals, after the output values of the LUTs have been compared,

wherein the masks of the first and the second LUTs are not combined if the LUTs have less than N common input signals or more than M unique input signals.